0061913

H2478

Shaw™

Shaw E & I, Inc.

Geotechnical Laboratory
PO Box 4339
1570 Bear Creek Road
Oak Ridge TN 37830
865/482-6497

CERTIFICATE OF ANALYSIS

Steven Trent
Fluor Hanford, Inc.
825 Jadwin Avenue
Richland, Washington 99352

January 19, 2003

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	**Eberline - Hanford**
Shaw Project Number:	**100846.04000000**
Client Sampling Authorization Form No.	F03-025
Client Sample Data Group:	H2478
Date Received by Lab:	January 2, 2004
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction/Case Narrative

Two soil samples were received by the Shaw Geotechnical Laboratory on January 2, 2004. Each sample was designated for a separate sample data group (SDG). Samples were submitted for determination of particle-size distribution, bulk density and moisture content. The sample numbers received were B17RY4 and B183N3.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

0000001

Ralph Cole
Laboratory Manager, Geotechnical Services

0000000

EDMC

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Oak Ridge TN
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II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2003. Shaw Environmental and infrastructure, Standard Operating Procedures.

Particle-Size Distribution of Soils	**ASTM D 422**
Moisture Content of Soil and Rock	**ASTM D 2216**
Bulk Density	**ASTM D 2937**
	USCAE 1110-2-0906

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.

- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.

- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

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- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.

- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

Two moisture content results are reported. One data page reports the moisture content of a sample aliquot submitted for "moisture content" determination. The second moisture result is reported on the grainsize and density report sheets, and was determined using excess material from those test specimens.

The bulk density test method requested was ASTM D 2937, Density of Soil In-Place by the Drive-Cylinder Method. This method covers field procedures used to procure undisturbed, near-surface soil samples, as well as analysis for bulk density. The data results presented here were derived form laboratory tests performed on client-supplied core (tube) samples. Shaw Environmental was not involved in sampling activities.

Appendix A
Sample Cross-Reference List

January 19, 2004
Steven Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.04000000
SAF No. F03-025
SDG No. H2478

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SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0253	B17RY4	Soil

Appendix B
Sample Test Results

January 19, 2004
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SDG No. H2478

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MOISTURE CONTENT

PROJECT NAME
Eberline - Hanford

PROJECT NUMBER
100846.04000000

IT LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE , % SW846	SOLIDS, % SW846
BC0253	B17RY4	2.9	2.9	97.1

ASTM D 2216 results are based on dry sample weight.
SW846 results are based on wet sample weight.
Solids content is determined by subtracting the SW846 moisture (%) from 100.

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BULK DENSITY/DRY DENSITY
EM-1110-2-1906, APPENDIX II

PROJECT NAME: **Eberline - Hanford**

PROJECT NUMBER: **100846.04000000**

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	AVERAGE LENGTH, inches	AVERAGE DIAMETER, inches	WET WEIGHT, grams	MOISTURE CONTENT, %	BULK DENSITY, pcf	DRY DENSITY, pcf
BC0253	B17RY4	5.9978	3.8773	2119.42	2.8	114.0	111.0

Moisture content calculated by ASTM D 2216 based on sample dry weight.
Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).
Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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PARTICLE-SIZE ANALYSIS
ASTM D 422

Project Name	Eberline - Hanford	Client Sample No.	B17RY4
Project No.	100846.04000000	Lab Sample No.	BC0253

Specific Gravity = 2.65
assumed for calculations

Moisture Content = 2.8%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	100.0%
	#4	4.750	100.0%
	#10	2.000	100.0%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	99.0%
	#40	0.425	65.9%
	#60	0.250	39.2%
	#100	0.149	26.9%
	#140	0.106	20.6%
	#200	0.075	15.8%

HYDROMETER ANALYSIS

	Diameter mm	Percent Finer
HYDROMETER		
	0.04922	12.3%
	0.03533	10.0%
	0.02264	8.2%
	0.01323	6.4%
	0.00942	5.0%
	0.00671	4.1%
	0.00438	2.7%
	0.00293	2.3%
	0.00137	1.8%

0.0% Gravel 84.2% Sand 15.8% Silt/Clay

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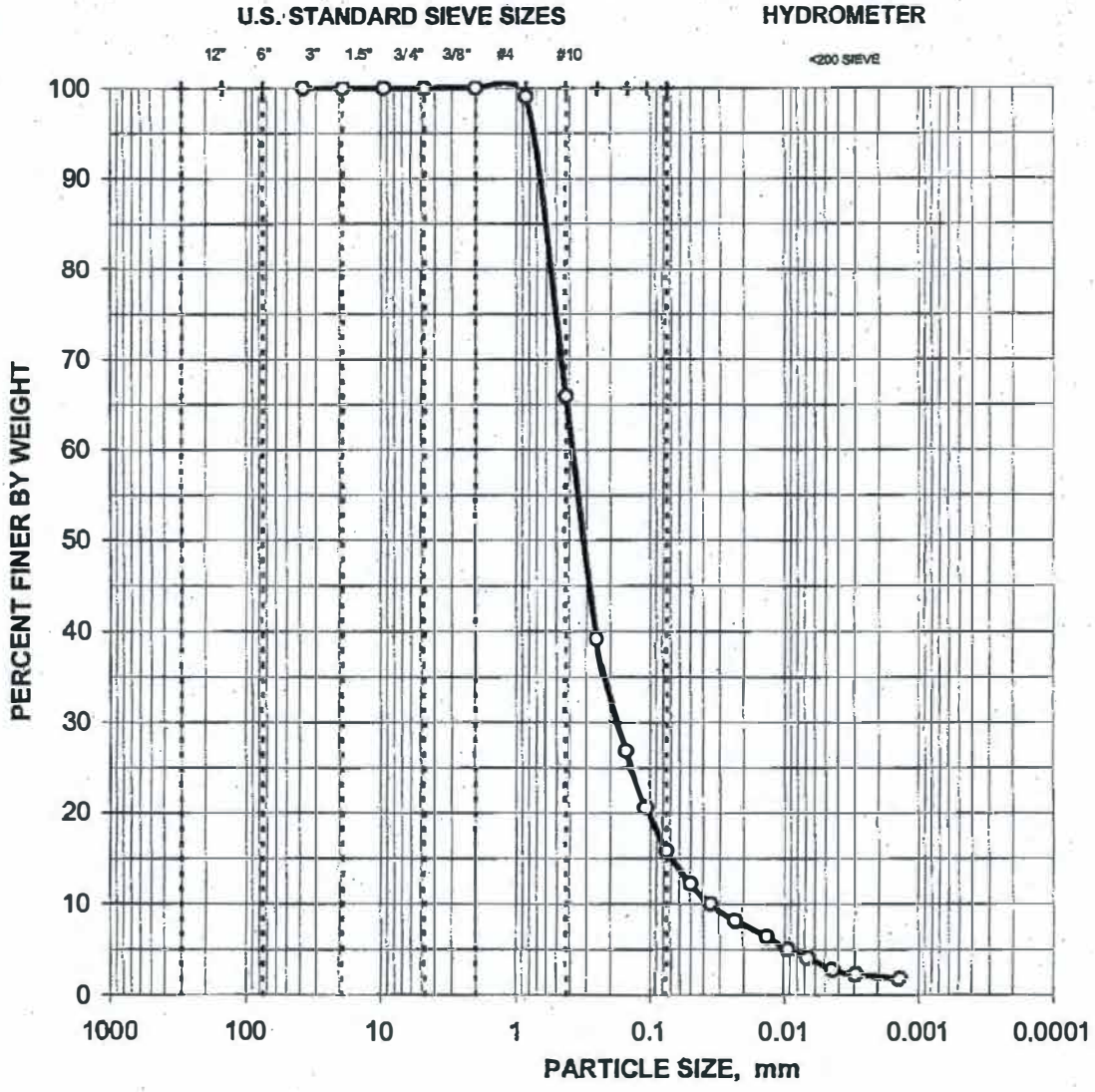
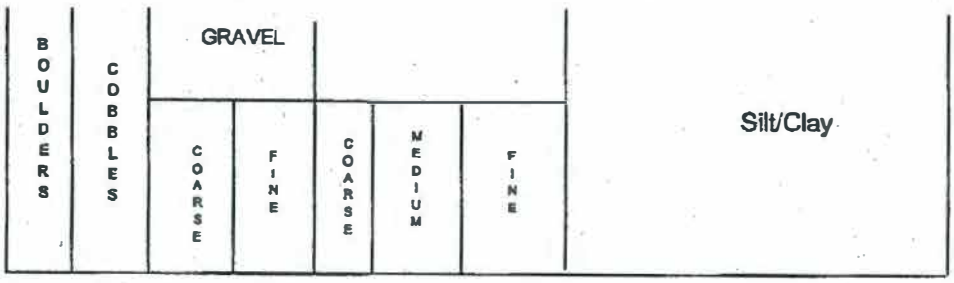
Eberline - Hanford



CLIENT SAMPLE NO.: B17RY4 **LAB SAMPLE NO.:** BC0253



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Appendix C
Chain-of-Custody and Request-for-Analysis Records

*AT 12/30/03

FLUOR Hanford Inc.	CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-025-017	Page 1 of 1
Collector: Pope/Pfister/Hughes	Company Contact: TRENT, STEVE; Telephone No.: 373-5689	Project Coordinator: TRENT, SJ	Price Code: ~~8N~~ ~~8H~~ *8D; Data Turnaround: ~~45 Days~~ *21 30 DAYS
Project Designation: 200-LW-1/LW-2 Characterization - Soil	Sampling Location: 216-B-58 #2 (97.5-100 FT)	SAF No.: F03-025	Air Quality ☐
Ice Chest No.: GPP-03-027	Field Logbook No.: HNF-N-336 1; COA: 119143ES10	Method of Shipment: FEDERAL EXPRESS	
Shipped To: Shaw Group	Offsite Property No.: See PTR	Bill of Lading/Air Bill No.: See PTR	

POSSIBLE SAMPLE HAZARDS/REMARKS: Radioactive Tie TO: B17T05

Special Handling and/or Storage

Preservation	None	None	
Type of Container	Moisture Resistant	Liner	
No. of Container(s)	1	1	
Volume	200mL	1000mL	
SAMPLE ANALYSIS	Moisture Content - D2216	Particle Size (Dry Sieve) - D422; Bulk Density - D2937	

Sample No.	Matrix *	Sample Date	Sample Time		
B17RY4	SOIL	12-22-3	10:05	X	X

BC 0253

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Kevin Hughes	12-22-3 12:05	Mo-026 Site Fridge #1	12-22-3 12:05
MO-026/Fridge #1	12/30/03 0945	Greg Thomas	12/30/03 0945
Greg Thomas	12/30/03 0945	Fed Ex	
Fed Ex		[signature]	12-31-03 1000
[signature]	12-31-03 1600	D. Huskey SHAW E+I	1-5-04/0900

*AT 12/30/03

SPECIAL INSTRUCTIONS
The laboratory is to analyze pH within 24 hours of sample receipt. The laboratory is to report kerosene range organics from the WTPH-D analysis. See SAF COC Comments for holding time issues.

Matrix *
S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By: Don Huskey SHAW E+I	Title: SR. LABTECH	Date/Time: 1-5-04/0900
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

A-6003-618(03/03)

0000019

PAGE 1 Eberline Srvces CHAIN OF CUSTODY ORD # R3-12-193

12/31/03 11:28:05 WORK ID: SAF# F03-025 SDG R2478

RCVD: 12/31/03 DUE: 01/21/04 KEEP: 01/20/05 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS
01A-S	B17RY4	SHAW-LAB	DISPOS E331S E333S

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
[signature]	12-31-03	SHAW	12-31-03	D Hinshaw/SHAW-I	1-5-04

0000013

PAGE 1 Eberline Srvces PURCHASE ORDER # R3-12-193-SU-SW

CONTRACT: PO# RSH-SOW-93-0003 12/31/03 11:27:44

SDG H2478

ORDER FROM: Eberline Services/Richmond
Analytical Services
2030 Wright Avenue
Richmond, CA 94804-0040
ATTEN Purchasing
PHONE 510-235-2633 x264

INVOICE TO: Eberline Services/Richmond
Analytical Services
2030 Wright Avenue
Richmond, CA 94804-0040
ATTEN Purchasing
PHONE 510-235-2633

AUTHORIZED BY

ORDER TO: Shaw Geotechnical Laboratory
1570 Bear Creek Road
Oak Ridge, TN 37830

ATTEN Ralph R. Cole

Please telephone our Sample Control Department immediately if any problems are encountered in the receipt or the analysis of the samples listed below.

This Purchase Order authorizes Shaw to perform all work listed on the enclosed COC. Alterations to work requested can only be made by Eberline Services or the appropriate Hanford client.

FRACTION	TEST	DESCRIPTION	UNITS	DUE DATE	COST
01A	E331S	D422 Particle Size-Dry Sve	Please Advise	01/21/04	0.00
	E333S	D2216 Moisture Content	Please Advise	01/21/04	0.00

TOTAL CHARGE NOT TO EXCEED $0.00

0000014

PAGE 1 Eberline Srvces WORK SHEET ORD # R3-12-193

CLIENT: WES_HANFORD CON: KCJ SDG 42478 CAT: ENVMSW RCVD: 12/31/03 DUE: 01/21/04

PROJ: WHC_FLR 12/31/03 11:27:53 STAT: TRANSMITTED 12/31/03

DASH	SAMPLE IDENTIFICATION	STORED	DEPT	START	DUE BY	TESTS, FRACTIONS /
01A-S	B17RY4	SHAW-LAB	EN	12/31	12/31	| DISPOS
			SU	SW 12/12	01/21	| E331S E333S

0000015

PARTS AND TOOLS RETURN (PTR) FORM
PROJECT HANFORD, 2355 STEVENS DR., RICHLAND, WA 99352

Source of Material

MR No. N/A PO No. N/A Buyer N/A PTR No. 12957

Rel. No. N/A Contract No. N/A Telephone N/A

P-Card Log No. /A Other N/A

Date	F.O.B.	Shipment Authorized by:	Total Pieces
12/30/03		Print Name: M. A. BAECHLER	1

Ship To: EBE INE SERVICES
203 WRIGHT AVENUE
RIC OND, CA 94804

For Account Of: Fluor Hanford, Inc.
2355 Stevens Drive
Richland, WA 99352

Contact: MEL SA MANNION
Contact Phone: (510) 235-2633
RA No.: N/A

Line Item No.	Quant	U/M	Description (Catalog ID No., Serial No., Gov. Tag No.)	Unit Price	Value
1	1	EA	Environmental Samples Packaged in Poly Cooler with Packing Peanuts COOLER # GPP-03-027 SAF # F03-020/F03-025 AIR BILL # 7911 0696 1376 41 LB	N/A	N/A

REASON FOR SHIPMENT: (Check one)

- ☐ Credit - Rel ... for Credit (Money Only) - Qty Receipt Required
- ☐ Replace - F ... rn for Replacement and/or Repair - Qty Receipt Required
- ☐ Inventory - ... turn to PHMC Inventory
- ☐ Over - Retu ... Over Shipment (No Receipt/Not a Credit)

*Requires identi... tion of controlling Purchase Order, Contract, or PHMC Property Custo... n accountable for the Govt. property in accordance with Regulations.

MISCELLANEOUS:

- ☐ Credit - Contract/P-Card/Non-Passport PO
- ☐ Core Charge - Return for Credit of Deposit
- ☐ Repair
- ☐ Ship Supplier Owned Materials, Containers, Samples, etc.
- ☐ Ship Waste/Material for Disposal
- ☒ *Ship Govt. Owned Materials, Containers, Samples, etc.
- ☐ OTHER

Hazardous Mate... ☐ Yes* ☒ No
Radioactive Mat... ☐ Yes* ☒ No
Rad. Control Su... ☐ Yes ☒ No

T&P Inspection (req'd): ☐ Yes ☒ No
Include appropriate shipping document. Radioactive Material is also hazardous.

Certified Free of Contamination: ☒ Yes ☐ No
Certifier's Name/Date

Custodian: M. BAECHLER
Telephone: 52 -0638

Current Location: MO-026/300 AREA 0000016

Date Available to Ship: 12/30/03

Item	% Cost	Cost Center	CACN	COA
ALL	30	M4P00	119142	ES20
ALL	70	M4P00	119143	ES20

Shipping Department

Routing FEDEX AIR
B/L No.
B/L Wt.
Frt. Collect
Acct. No.

By C.R. Nelson
Date Shipped 12-30-03
OSD&D No.
Shipping Notice No.
Receipt No.

S H A W

RICHMOND, CA LABORATORY

EBERLINE SERVICES

SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 12-31-03

CoC No. F03-025-017

Container I.D. No. ARP-03-027 Requested TAT (Days) 21 P.O. Received Yes [ ] No [ ]

INSPECTION

1.	Custody seals on shipping container intact?	Yes [✓]	No [ ]	N/A [ ]
2.	Custody seals on shipping container dated & signed?	Yes [✓]	No [ ]	N/A [ ]
3.	Custody seals on sample containers intact?	Yes [✓]	No [ ]	N/A [ ]
4.	Custody seals on sample containers dated & signed?	Yes [✓]	No [ ]	N/A [ ]
5.	Packing material is:	Wet [ ]	Dry [✓]	

6. Number of samples in shipping container: 1

7. Number of containers per sample: 2 (Or see CoC ________)

8. Samples are in correct container Yes [✓] No [ ]

9. Paperwork agrees with samples? Yes [✓] No [ ]

10. Samples have: Tape [✓] Hazard labels [ ] Rad labels [ ] Appropriate sample labels [✓]

11. Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]

12. Samples are: Preserved [ ] Not preserved [✓] pH ______ Preservative ______

13. Describe any anomalies: ______

14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date ______

15. Received by [signature] Date: 12-31-03 Time: 1000

Customer Sample No.	cpm	mR/hr	wipe	Customer Sample No.	cpm	mR/hr	wipe
~~10626~~	~~240~~						
Bi 7Rgn							

Ion Chamber Ser. No. ______ Calibration date ______

Alpha Meter Ser. No. ______ Calibration date ______

Beta/Gamma Meter Ser. No. 10626 Calibration date 12-31-03

0000017

EBERLINE SERVICES **ANALYTICAL SERVICES GROUP**

Richmond, CA Laboratory

Radioactive Material Shipment Record

page 1 of 1

Shipped to:
SHAW GEOTECHNICAL LABORATORY
1570 BEAR CREEK ROAD
OAK RIDGE, TN 37830

Date: 12-31-03
Via: FED EX
Airbill #: 7924 0087 8228
Rad Mat License #

Container description: ICE CHEST Weight: 30

Sample Dose measurements:

Sample No.	cpm	mR/hr	Sample No.	cpm	mR/hr	Sample No.	cpm	mR/hr
B17RY4	<40							
B183N3	<40							

G/M survey: Detector # 10626 ; cpm <40 ; Alpha survey: Detector # ; cpm
Ion chamber # ; 1 meter from surface, μR/hr: ; surface, μR/hr:

Shipping Container Dose Measurements

G/M Survey: Detector 10626 ; cpm <40 ; Alpha survey: Detector # ; cpm
Ion Chamber # ; 1 meter from surface μR/hr ; surface μR/hr

Labeling required:

- ✓ None
- ___ Rad. materials, empty container, 49CFR 173.427
- ___ Limited quantity 49CFR173.421
- ___ Excepted instruments & articles
- ___ Low Specific Activity
- ___ White I
- ___ Yellow II
- ___ Yellow III

FORM

Normal
Special
Transport Index:

ID #	Radionuclide	Activity	Quantity	Form	Container
B17RY4	Gross B	23,000	276g	SOIL	METAL CAN

Wipe tests:

Location:	alpha dpm/cm²	beta dpm/cm²	counting instrument
			0000018

L. G. [signature]
Radiation Safety Representative

12.31.03
Date

[signature]
Technician

Tu to B17T03/B17KY4(Snow) 97.51
B.58

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
Project: F03-025: F03-025

Group #: WSCF20031698

Sample #	Client ID			CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive
Radiochemistry															
W030001224	B17T05	GPP	TRENT	12587-46-1	Gross alpha	SOIL	LA-508-421	U	-0.600	pCi/g	1.00	1.6	12/23/03	12/22/03	12/22/03
W030001224	B17T05	GPP	TRENT	E.T.C	Alpha error by LC	SOIL	LA-508-421	+-	3.6	pCi/g	1.00	0.0	12/23/03	12/22/03	12/22/03
W030001224	B17T05	GPP	TRENT	12587-47-2	Gross beta	SOIL	LA-508-421		8.40	pCi/g	1.00	1.9	12/23/03	12/22/03	12/22/03
W030001224	B17T05	GPP	TRENT	E.T.C	Beta error by LC	SOIL	LA-508-421	+-	5.0	pCi/g	1.00	0.0	12/23/03	12/22/03	12/22/03

MDL=Minimum Detection Limit U - Analyzed for but not detected above limiting criteria.
RQ=Result Qualifier

DF=Dilution Factor
* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1
Ground Water Protection Program

0000019